

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (previously presented) A motor vehicle, comprising:
 - a primary power source;
 - a rear driveline including a set of rear wheels;
 - a front driveline including a set of front wheels;
 - a transfer case having a rear output shaft interconnecting said primary power source to said rear driveline for driving said rear wheels, a front output shaft connected to said front driveline, and an electric motor driving said front output shaft for driving said front wheels; and
 - a control system for controlling actuation of said electric motor such that an electric operating mode is established when said electric motor drives said front output shaft while said rear output shaft is not driven by said primary power source.

2. (previously presented) The motor vehicle of Claim 1 wherein said transfer case further includes a reduction gearset having an input driven by said electric motor and an output driving said front output shaft.

3. (previously presented) The motor vehicle of Claim 1 wherein said control system is operable to define a hybrid operating mode when said electric motor is actuated to drive said front output shaft while said rear output shaft is driven by said primary power source.

4. (previously presented) The motor vehicle of Claim 1 wherein said control system is operable to define an engine operating mode when said electric motor is off such that said front driveline is not driven while said primary power source drives said rear driveline.

5. (previously presented) The motor vehicle of Claim 1 wherein said control system includes a controller and sensors for detecting operating characteristics of the vehicle, said controller operable for controlling independent actuation of said primary power source and said electric motor.

6. (previously presented) The motor vehicle of Claim 1 wherein said transfer case further includes a mode clutch operably disposed between said rear and front output shafts and a clutch operator adapted to engage said mode clutch for coupling said front output shaft for rotation with said rear output shaft.

7. (previously presented) A transfer case for use in a motor vehicle having a powertrain and front and rear drivelines, comprising:

a rear output shaft adapted to deliver drive torque from the powertrain to the rear driveline;

a front output shaft adapted for connection to the front driveline;

a reduction unit having an input member driving an output member, said output member connected to said front output shaft;

an electric motor driving said input member of said reduction unit and operable for delivering drive torque to the front driveline; and

a control system for controlling actuation of said electric motor to define an electric operating mode wherein said electric motor delivers drive torque to the front driveline while no drive torque is delivered from the powertrain to the rear driveline.

8. (cancelled)

9. (previously presented) The transfer case of Claim 7 wherein a hybrid operating mode is established with the powertrain delivering drive torque to the rear driveline while said electric motor delivers drive torque to the front driveline.

10. (previously presented) The transfer case of Claim 7 wherein said control system includes a controller and sensors for detecting operating characteristics of the vehicle and sending sensor input signals to said controller, said controller operable to send control signals to said electric motor.

11. (previously presented) The transfer case of Claim 7 further comprising a mode clutch for selectively coupling said rear output shaft to said front output shaft, said mode clutch having a power-operated clutch operator which is controlled by said control system.

12. (previously presented) The transfer case of Claim 11 having a transfer unit including a first sprocket rotatably supported on said rear output shaft, a second sprocket fixed to said front output shaft, a power chain connecting said first and second sprockets, and wherein said mode clutch is operable in a released mode to permit rotation of said first sprocket relative to said rear output shaft and in an engaged mode to rotatively couple said rear output shaft to said first sprocket.

13. (original) The transfer case of Claim 12 wherein said control system permits selection of a two-wheel drive mode, a part-time four-wheel drive mode and an automatic four-wheel drive mode, said two-wheel drive mode is established with said mode clutch in its released mode, said part-time four-wheel drive mode is established with said mode clutch in its engaged mode, and said automatic four-wheel drive mode is established with said mode clutch varied between said engaged and released modes.

14. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;

a rear driveline including a rear differential connecting a pair of rear wheels;

a front driveline including a front differential connecting a pair of front wheels;

a transfer case including a rear output shaft operable for transferring power from said powertrain to said rear differential, a front output shaft connected to said front differential, an electric motor having a motor output shaft and a gearset interconnecting said motor output shaft to said front output shaft; and

a control system for controlling actuation of said electric motor for transferring power to said front output shaft, and wherein an electric operating mode is established when said electric motor is actuated for driving said front output shaft while no power is transferred from said powertrain to said rear output shaft.

15. (cancelled)

16. (previously presented) The hybrid motor vehicle of Claim 14 wherein a hybrid operating mode is established when said powertrain is actuated for driving said rear output shaft and said electric motor is actuated for driving said front output shaft.

17. (previously presented) The hybrid vehicle of Claim 14 wherein said transfer case further includes a mode clutch for selectively coupling said front output shaft to said rear output shaft.

18. (previously presented) The hybrid vehicle of Claim 17 wherein said transfer case further includes a transfer unit having a first sprocket rotatably supported on said rear output shaft, a second sprocket fixed to said front output shaft, a power chain connecting said first and second sprockets, and wherein said mode clutch is controlled by said control system and is operable in a released mode to permit rotation of said first sprocket relative to said first output shaft and in an engaged mode to rotatively couple said rear output shaft to said rear sprocket.

19. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;

a rear driveline including a rear differential connecting a pair of rear wheels;

a front driveline including a front differential connecting a pair of front wheels;

a transfer case including a rear output shaft driven by said powertrain and operably connected to said rear differential, a front output shaft operably connected to said front differential, a transfer unit coupled to said front output shaft, a mode clutch operable in an engaged mode to couple said transfer unit to said rear output shaft to establish a four-wheel drive mode and in a released mode to disengage said transfer unit from said rear output shaft to establish a two-wheel drive mode, and an electric motor for driving said front output shaft; and

a control system for controlling actuation of said mode clutch and said electric motor, said control system establishing a two-wheel drive electric operating mode when said mode clutch is in its released mode and said electric motor is actuated to drive said front output shaft while no drive torque is transferred from said powertrain to said rear output shaft.

20. (cancelled)

21. (previously presented) A transfer case for use in a motor vehicle having a powertrain and front and rear drivelines, comprising:

a rear output shaft for transmitting drive torque from the powertrain to the rear driveline;

a front output shaft adapted for connection to the front driveline;

an electric motor for selectively driving said front output shaft for transmitting drive torque to the front driveline;

a mode clutch for selectively coupling said rear output shaft to said front output shaft; and

a control system for controlling actuation of said mode clutch and said electric motor, said control system establishing a two-wheel electric drive mode when said mode clutch is released and said electric motor is actuated to drive said front output shaft while no drive torque is transmitted from the powertrain to said rear output shaft.

22. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;
a rear driveline including a rear differential connecting a pair of rear wheels;
a front driveline including a front differential connecting a pair of front wheels;
a transfer case including a rear output shaft driven by said powertrain and operably connected to said rear differential, a front output shaft operably connected to said second front differential, a mode clutch for selectively coupling said rear output shaft to said front output shaft, and an electric motor for selectively driving said front output shaft; and
a control system for controlling actuation of said electric motor and said mode clutch, said control system being operable to establish a two-wheel drive electric operating mode when said mode clutch is released and said electric motor drives said front output shaft while no power is transmitted by said powertrain to said rear output shaft.

23. (previously presented) The hybrid motor vehicle of Claim 22 wherein a two-wheel drive engine operating mode is established when said mode clutch is released and said powertrain drives said rear output shaft while no power is transmitted by said electric motor to said front output shaft.

24. (currently amended) The hybrid motor vehicle of Claim 22 wherein a four-wheel drive hybrid operating mode is established when said powertrain is actuated for driving said rear output shaft and said electric motor is actuated for driving said front output shaft.

26. (previously presented) A transfer case for use in a motor vehicle having an engine and rear and rear drivelines, comprising:

a first rear output shaft for transmitting drive torque from the engine to the rear driveline;

a front output shaft connected to the front driveline;

an electric motor that can be selectively actuated for transmitting drive torque only to said front output shaft; and

a control system operable to establish an engine drive mode, an electric drive mode and a hybrid drive mode, said engine drive mode is established when the engine drives said rear output shaft and said electric motor is off, said electric drive mode is established when the engine is off and said electric motor drives said front output shaft, and said hybrid drive mode is established when the engine drives said rear output shaft and said motor drives said front output shaft.

27. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;

a rear driveline including a pair of rear wheels;

a front driveline including a pair of front wheels;

a transfer case including a rear output shaft for transmitting drive torque from said powertrain to said pair of rear wheels, a front output shaft operably connected to said pair of front wheels, a reduction unit having an input member fixed to said front output shaft and an output member, and an electric motor for selectively driving said output member so as to transmit drive torque to said pair of front wheels; and

a control system for controlling actuation of said powertrain and said electric motor, said control system operable to establish an electric mode and an engine drive mode, said electric drive mode is established when said motor drives said front output shaft and said rear output shaft is not driven by said powertrain, and said engine drive mode is established when said powertrain drives said rear output shaft and said front output shaft is not driven by said motor.

28. (previously presented) The hybrid motor vehicle of Claim 19 wherein said control system establishes a four-wheel drive engine operating mode when said mode clutch is in its engaged mode and said electric motor is off such that drive torque is transmitted from said powertrain to both of said rear and front output shafts.

29. (previously presented) The hybrid motor vehicle of Claim 19 wherein said control system establishes a four-wheel drive hybrid operating mode when said mode clutch is in its released mode and said electric motor is actuated to drive said front output shaft while drive torque is transmitted from said powertrain to said rear output shaft.

30. (previously presented) The transfer case of Claim 21 wherein said control system establishes a four-wheel engine drive mode when said mode clutch is engaged and no drive torque is transmitted by said electric motor to said front output shaft such that the powertrain transmits drive torque to both of said rear and front output shafts.

31. (previously presented) The transfer case of Claim 21 wherein said control system establishes a four-wheel hybrid drive mode when said mode clutch is released, said electric motor transmits drive torque to said front output shaft and the powertrain transmits drive torque to the rear output shaft.

32. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;

a first driveline including a first differential connecting a pair of first wheels;

a second driveline including a second differential connecting a pair of second wheels;

a transfer case including a first output shaft driven by said powertrain and operably connected to said first differential, a second output shaft operably connected to said second differential, a mode clutch for selectively coupling said first output shaft to said second output shaft, and an electric motor for selectively driving said second output shaft; and

a control system for controlling actuation of said electric motor and said mode clutch, said control system establishing a two-wheel drive electric operating mode when said mode clutch is released and said electric motor drives said second output shaft while no power is transmitted by said powertrain to said first output shaft, and said control system establishing a two-wheel drive engine operating mode when said mode clutch is released and said powertrain drives said first output shaft while no power is transmitted by said electric motor to said second output shaft.

33. (previously presented) A hybrid motor vehicle, comprising:

a powertrain including an internal combustion engine and a transmission;

a first driveline including a first differential connecting a pair of first wheels;

a second driveline including a second differential connecting a pair of second wheels;

a transfer case including a first output shaft driven by said powertrain and operably connected to said first differential, a second output shaft operably connected to said second differential, a transfer unit coupled to said second output shaft, a mode clutch operable in an engaged mode to couple said transfer unit to said first output shaft to establish a four-wheel drive mode and in a released mode to disengage said transfer unit from said first output shaft to establish a two-wheel drive mode, and an electric motor for driving said second output shaft; and

a control system for controlling actuation of said mode clutch and said electric motor, said control system establishing a two-wheel drive electric operating mode when said mode clutch is in its released mode and said electric motor is actuated to drive said second output shaft while no drive torque is transferred from said powertrain to said first output shaft, and said control system establishing a four-wheel drive hybrid operating mode when said mode clutch is in its released mode and said electric motor is actuated to drive said second output shaft while drive torque is transmitted from said powertrain to said first output shaft.

34. (previously presented) A transfer case for use in a motor vehicle having a powertrain and first and second drivelines, comprising:

a first output shaft for transmitting drive torque from the powertrain to the first driveline;

a second output shaft adapted for connection to the second driveline;

an electric motor for selectively driving said second output shaft for transmitting drive torque to the second driveline;

a mode clutch for selectively coupling said first output shaft to said second output shaft; and

a control system for controlling actuation of said mode clutch and said electric motor, said control system establishing a two-wheel electric drive mode when said mode clutch is released and said electric motor is actuated to drive said second output shaft while no drive torque is transmitted from the powertrain to said first output shaft, and said control system establishing a four-wheel hybrid drive mode when said mode clutch is released and said electric motor drives said second output shaft while the powertrain transmits drive torque to said first output shaft.